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# Prevalence of abnormal eating behaviors in adolescents in Mexico (Mexican National Health and Nutrition Survey 2006)

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## Abstract

**Objective.** To describe the prevalence of abnormal eating behaviors in a population-based nationwide survey. **Material and Methods.** A stratified, probabilistic, multistage design sampling process was used. The Brief Questionnaire for Risky Eating Behaviors was included in the Mexican Health and Nutrition Survey 2006 (ENSANUT 2006) and administered to participants 10-19 years old ( $n = 25\ 166$ ). The study had the power to describe nationwide characteristics by age, regions and urban/rural settings. **Results.** A high risk for having an eating disorder was found in 0.8% of the total participants (0.4% male adolescents and 1.0% female). Inhabitants in large cities showed higher risk for having an abnormal eating behavior compared to subjects living in other settings. The highest prevalences were found in males > 15 years old and females > 13 years old for all evaluated behaviors. **Conclusions.** Results show less prevalence of risky eating behaviors among adolescents in comparison to other populations. The female/male ratio was 3:1, far different from the 9:1 shown in a previous study in Mexico City, but similar to results from the US national eating disorders screening.

**Key words:** adolescents; eating, eating disorders; national surveys; Mexico

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## Resumen

**Objetivo.** Describir la prevalencia de conductas alimentarias anormales en una encuesta nacional de base poblacional. **Material y métodos.** Diseño muestral probabilístico, polietápico, por conglomerados y estratificado. Se utilizó el Cuestionario Breve de Conductas Alimentarias de Riesgo de la ENSANUT 2006, en adolescentes entre 10 y 19 años de edad ( $n = 25\ 166$ ) de ambos sexos, con resultado nacional, por región y tipo de localidad. **Resultados.** En 0.8% de los participantes se encontró alto riesgo de desarrollar un trastorno de conducta alimentaria (0.4% hombres y 1.0% mujeres). La edad de mayor riesgo fue > 15 años en hombres y > 13 en mujeres. Los habitantes de áreas metropolitanas presentan un riesgo mayor que la población rural y urbana. **Conclusiones.** La prevalencia de conductas alimentarias de riesgo en adolescentes es menor en comparación con otras poblaciones. La relación mujer/hombre resultó de 3:1, muy diferente del 9:1 encontrado en población estudiantil de la Ciudad de México, pero similar a lo reportado en la encuesta nacional de trastornos alimentarios en EUA.

**Palabras clave:** adolescentes; conducta alimentaria; trastornos de la conducta alimentaria; encuestas nacionales; México

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Eating behavior is a bio-psycho-social phenomenon determined by environmental and familial factors, traditions and culture. It is constructed early in life, functions as a homeostatic system during life crises and is a key regulator of emotional stability. But it may become detrimental, as happens in binge-eating disorder and other unspecified eating disorders. The stressful conditions of urban life and the unfulfillment of many primary social and emotional needs in a large percentage of the population (regardless of gender) are fertile soil for abnormal eating behavior. Two recent lines of research, body image and genetics, will expand eating behavior studies; the authors are working in both as well as in prevention in the Mexican population.

A continuous growth in the number of cases of eating disorders and risky eating behaviors has been observed in Mexico during the past two decades. The interest in these disorders has increased among clinicians and researchers.<sup>1</sup> There is an urgent need for nationwide, population-based estimates of the prevalence of these conditions. In Mexico, the only available nationwide data was obtained from the "National Survey on Psychiatric Epidemiology" in which only one of the eating disorders, bulimia, was reported. Bulimia was considered present in 1.8% of women and 0.6% of men aged 18-65 years old participating in the study.<sup>2</sup> Regional studies such as the "Survey on Drugs and Alcohol Consumption Prevalence among Mexico City Population" have provided data on some special populations, such as students,<sup>3</sup> using questionnaires as screening tools for detecting abnormal eating behaviors. An increase in the number of individuals having these inadequate behaviors has been described for the 1997-2006 period (from 3.4 to 8.1% in women and from 1.3 to 4.1% in men). Preoccupation with gaining weight increased from 5.4 to 11.5% in males and from 15.3 to 29.8% in females in the same period.<sup>4,5</sup> Binge eating was reported in 5% and loss of control while eating in 3% of men and women in the 1997 survey. Similar conclusions have been reached by several authors<sup>6,7</sup> in studies done in children, adolescents, adults and populations considered at risk for having eating disorders.<sup>8-12</sup> These reports have provided consistent results, with both abnormal eating behaviors and eating disorders being reported frequently among genders<sup>4,13,14</sup> and not differing between socioeconomic groups<sup>15</sup> or regions.<sup>1</sup>

Eating behavior could be a forgotten link between the environmental and the biological factors that drive the chronic disease epidemic that westernized societies are confronting. Eating behavior is a key component that should be considered in the evaluation and treatment

of several common chronic disorders. Multidisciplinary approaches capable of modifying abnormal eating behaviors are required to achieve adequate adherence to therapy.<sup>16-18</sup> This conclusion is valid for the treatment of diabetes,<sup>19</sup> obesity,<sup>20,21</sup> drug addiction<sup>22,23</sup> and the majority of chronic diseases<sup>24</sup> and its importance has been reviewed recently by Cordova.<sup>25</sup>

Regrettably, the contribution of eating disorders to the chronic disorders epidemic that Mexico is having cannot be estimated because eating disorders have not been evaluated in Mexican population-based surveys. The Mexican Health Nutrition Survey 2006 (ENSANUT 2006) is the first survey in which a validated questionnaire that identifies persons with abnormal eating behaviors is included. Its application was limited to the age group 10-19 years ( $n=25\,166$ ). Thus our objective was to describe the prevalence of abnormal eating behaviors in Mexican adolescents using a population-based nationwide survey.

## Material and Methods

A validated version of the "Brief questionnaire for risky eating behaviors"<sup>3</sup> was included in the ENSANUT 2006. This questionnaire has been previously used in the "Survey on Drugs and Alcohol Consumption Prevalence among Mexico City School Age Population." The original version was modified and the resulting questionnaire was validated in Mexico with a group of women, with and without eating disorders.<sup>26</sup>

### Mexican Health and Nutrition Survey 2006

The design and procedures of the ENSANUT 2006 have been described in detail elsewhere. Briefly, it includes the evaluation of 48 304 households, 206 700 individuals, 24 098 boys and girls, 25 166 adolescents, 45 446 adults, 50 027 blood samples, and 90 267 anthropometric measurements. A probabilistic, multistage, stratified analysis was used. The design, implementation and data capture were carried out during 2005 and 2006.

The sample size was capable of detecting conditions that have a prevalence of at least 8.1% with a relative error of estimation of 0.25, a non-response rate of 20%, and a confidence level of 95% at the state level; a design effect of 1.7 was allowed. The study was done in accordance with the Helsinki Declaration of Human Studies.

In this report, we used the information for 25 056 adolescents (50.3% females and 49.7% males) aged 10 to 19 years old. The proportion between genders was similar throughout the age range.

### The brief questionnaire for risky eating behaviors

The questionnaire is a self-administered evaluation composed by ten items that assess eating behaviors and the presence of over-riding fears of gaining weight during the previous three months. Every item has four response options (never= 0, sometimes= 1, frequently= 2 (twice a week) and very frequently= 3 (more than two times in a week). The sum of points was used to classify cases as being at risk for having an eating disorder (> 10 points).<sup>27</sup>

### Statistical analysis

The statistical analysis was done using SPSS for Windows version 12.0. Frequencies are presented stratified by age, gender, region (north, center-west, center and south-southeast)\* and type of setting (metropolitan

areas, urban or rural). The data presented show the percentage of adolescents that responded to the frequently or very frequently response option. A variance analysis was carried out to compare data by age (grouped in two ranges 10-13, 14-19), gender, region and type of setting, with a randomly selected sample of 15% of the total cases to confirm that statistical differences were not the result of an effect of the sample size.

### Ethical considerations

All participants signed an informed consent previous to the survey interview. The survey and the written consent form were approved by the Ethics Committee of the National Institute of Public Health.

## Results

The study sample included 25 056 individuals aged 10-19 representative of this age group in Mexico. The risk for having an eating disorder (a total score > 10 points) was found in 0.8% of the participants (0.4% of all males and 1.0% of all females).

Preoccupation with weight gain, binge eating and loss of control while eating were quite frequent in both genders (Table I), however fasting was significant only for women. The rest of the behaviors yielded percentages lower than 2%. Intense fear of gaining weight

\* North: Baja California Norte, Baja California Sur, Sonora, Chihuahua, Coahuila, Nuevo León, Tamaulipas; Center-west: Aguascalientes, Nayarit, Jalisco, Colima, Sinaloa, Michoacán, Guanajuato, Durango, San Luis Potosí, Zacatecas; Center: Distrito Federal, Estado de México, Querétaro, Puebla, Hidalgo, Tlaxcala, Morelos; South-southeast: Chiapas, Yucatán, Campeche, Quintana Roo, Oaxaca, Guerrero, Tabasco, Veracruz.

Table I  
NATIONAL AND REGIONAL PREVALENCE OF ABNORMAL EATING BEHAVIORS IN ADOLESCENTS BY GENDER

	North	Center-west	Center	South-Southeast	National
<b>Males</b>					
Preoccupation with gaining weight	6.7	7.8	7.2	5.5	6.9
Binge eating*	9.4	9.5	9.3	6.9	8.8
Loss of control while eating*	5.9	5.0	4.2	3.3	4.5
Self induced vomiting*	0.4	0.4	0.3	0.3	0.3
Fasting	0.6	0.9	0.7	0.5	0.7
Dieting	0.4	0.5	0.3	0.4	0.4
Excessive exercising	1.8	2.0	1.4	1.6	1.7
Diet pills use	0.1	0.3	0.04	0.02	0.1
Diuretics use	-	0.09	0.2	0.08	0.1
Laxatives use	-	0.2	0.05	0.02	0.1
<b>Females</b>					
Preoccupation with gaining weight	17.8	15.6	14.2	12.7	14.8
Binge eating*	11.4	10.2	8.2	8.7	9.4
Loss of control while eating	6.5	6.5	5.1	4.6	5.6
Self induced vomiting	0.7	0.7	0.4	0.5	0.5
Fasting	3.0	2.4	2.0	1.5	2.1
Dieting	1.7	1.7	1.1	1.5	1.5
Excessive exercising	1.5	1.4	1.1	1.6	1.4
Diet pills use	0.7	0.5	0.1	0.1	0.3
Diuretics use	0.3	0.4	0.4	0.1	0.3
Laxatives use	0.5	0.5	0.03	0.2	0.3

\*p< 0.01

during the previous three months was reported by 6.9% of the males and 14.8% of all females, binge eating was found in 8.8% of men and 9.4% of women. Loss of control while eating was found in 4.5% of men and 5.6% of women and fasting was found in 2.1% of women only. Statistical differences between boys and girls were found in preoccupation with gaining weight, fasting and dieting ( $p < 0.01$ ).

The number of items in the questionnaire that were answered positively was similar between genders. Overall, a total of 11.2% of the population reported one abnormal eating behavior, 2.8% reported two, 0.6% reported three and only 0.1% reported four positive responses. The responses by gender are shown in Table II; men had as many as five different eating behaviors while women had as many as 10 in the center-west region. Five percent of women had an average of two behaviors and up to 4% had three or more behaviors (Table II).

### Analysis by region

The highest percentages of positive responses (three or more) were found in the northern and center-west regions for males (1.4% and 2.1%, respectively) and the center-west and northern regions for women (3.8%) followed by the northern region (2.4%). Among male adolescents, differences were found among binge eating, loss of control and self-induced vomiting between the northern region and the other three regions. For female adolescents, differences were only found in binge eating among the northern and the other regions (Tables I and II).

### Analysis by age group

All abnormal eating behaviors became more common in direct proportion with age among females, mostly after age 13, while among males, the time effect was less clear. The prevalence of preoccupation with gaining weight varied between 4.8 to 9.1% among males and 7.5 to 25.9% in females. The analysis for male adolescents did not yield any statistical differences, and for females differences were found between the two age groups for preoccupation with gaining weight, binge eating, loss of control, dieting, and diet pills and diuretic use (Table III).

### Analysis by urban or rural locations

Prevalence in urban locations is double that of rural ones for both male and female adolescents. Fear of gaining weight, binge eating and loss of control while eating were more common among subjects living in urban settings, whilst most behaviors were 50% less common in rural settings. Statistical differences were found in binge eating in males between rural and urban settings, but not between metropolitan and urban locations. Among females, differences were found between rural settings and metropolitan areas for preoccupation, binge eating and loss of control, and between both urban settings and rural ones for dieting (Table IV).

## Discussion

Our data confirm that the prevalence of diverse abnormal eating behaviors is significant among Mexican

**Table II**  
**PERCENTAGE OF NUMBER OF BEHAVIORS BY GENDER AND REGIONS**

Region	North		Center-west		Center		South-Southeast	
	Males	Females	Males	Females	Males	Females	Males	Females
1	11.3	17.2	10.9	14.8	11.8	13.4	8.6	12.3
2	4.7	5.8	4.0	5.7	3.8	6.0	2.9	5.4
3	1.1	2.4	1.4	2.4	0.5	1.6	0.9	1.8
4	0.3	0.3	0.5	0.8	0.3	0.3	0.2	0.4
5		-	0.2	0.2	0.2	0.2		0.1
6		0.2		0.1				0.1
7				0.1				
8				-				
9				0.1				
10				0.1				

**Table III**  
**PREVALENCE OF ABNORMAL EATING BEHAVIORS IN ADOLESCENTS BY GENDER AND AGE**

	Age (years)									
	10	11	12	13	14	15	16	17	18	19
<b>Males</b>										
Preoccupation with gaining weight	7.5	7.3	5.7	7.8	4.8	5.3	9.1	7.1	6.6	8.3
Binge eating	8.6	8.2	8.5	8.9	7.5	8.7	10.6	8.3	11.7	7.3
Loss of control while eating	5.3	5.6	3.3	5.2	4.2	4.7	4.0	2.3	5.3	7.8
Self induced vomiting	0.8	0.2	0.2	0.1	0.5	0.2	0.6	0.2	0.2	-
Fasting	0.3	0.7	0.3	0.6	1.2	0.6	0.1	1.1	1.1	0.9
Dieting	-	0.3	0.1	0.4	0.2	0.3	0.5	0.6	0.3	1.3
Excessive exercising	1.0	1.6	1.6	2.1	2.0	2.1	1.7	0.9	1.6	2.4
Diet pills use	0.1	-	-	0.2	0.1	-	0.4	0.2	-	0.1
Diuretic use	0.1	0.3	-	-	-	-	0.5	0.1	-	-
Laxative use	0.3	0.1	-	-	-	-	-	0.2	-	-
<b>Females</b>										
Preoccupation with gaining weight*	8.4	7.5	9.7	10.5	16.0	17.6	20.0	16.8	19.7	25.9
Binge eating†	7.0	5.4	6.1	8.2	8.5	11.6	11.9	12.3	12.3	12.3
Loss of control while eating†	5.0	4.0	5.4	6.8	3.7	6.1	7.3	6.5	5.8	5.5
Self induced vomiting	0.8	0.1	0.2	0.3	0.5	0.8	0.8	0.6	0.8	0.6
Fasting	0.5	0.3	0.4	1.2	2.0	3.2	2.4	3.2	2.6	6.7
Dieting†	0.9	0.5	0.4	1.0	1.2	2.0	2.5	2.5	1.6	2.4
Excessive exercising	0.8	0.6	1.1	1.4	1.7	2.6	1.0	1.7	1.6	1.8
Diet pills use*	-	0.1	0.1	-	0.2	0.8	0.6	0.2	0.8	0.4
Diuretic use*	-	-	0.1	-	-	1.1	0.3	0.5	0.8	0.3
Laxative use	-	-	0.1	-	0.3	0.5	0.6	0.7	0.3	0.3

\*  $p < 0.01$ †  $p < 0.05$ 

**Table IV**  
**PREVALENCE OF ABNORMAL EATING BEHAVIORS IN ADOLESCENTS BY GENDER AND TYPE OF SETTING**

	Rural	Urban	Metropolitan area
<b>Males</b>			
Preoccupation with gaining weight	4.6	7.7	7.7
Binge eating*	4.8	8.9	11.0
Loss of control while eating	2.7	4.9	5.2
Self induced vomiting	0.2	0.4	0.4
Fasting	0.5	1.0	0.6
Dieting	0.4	0.7	0.3
Excessive exercising	0.9	1.8	2.1
Diet pills use	0.1	0.1	0.1
Diuretic use	0.1	0.1	0.1
Laxative use	0.1	0.1	0.1
<b>Females</b>			
Preoccupation with gaining weight*	9.3	15.5	17.7
Binge eating*	5.5	10.4	11.1
Loss of control while eating*	3.8	5.8	6.6
Self induced vomiting	0.5	0.7	0.5
Fasting	0.8	2.0	3.0
Dieting*	1.0	1.3	1.8
Excessive exercising	1.0	1.2	1.8
Diet pills use	0.1	0.3	0.4
Diuretic use	0.1	0.2	0.4
Laxative use	0.2	0.4	0.3

\*  $p < 0.01$ 

adolescents. This analysis represents the first attempt to characterize the population at high risk of abnormal eating behaviors with a nationally representative sample in a Latin American country using a previously validated questionnaire. The sample size allowed us to present information stratified by age and gender groups. Information is also shown by region and by location. The results will be helpful to guide the National Strategy for Clinical Prevention of Eating Disorders in Mexico with regard to adolescents, and to consider the risk of abnormal eating behavior when preventive initiatives are designed to address obesity and nutrition-related chronic diseases.

The prevalence of abnormal eating behaviors reported here was lower than that observed in the "Survey on Drugs and Alcohol Consumption Prevalence among Mexico City School Age Population." This is probably due to differences in the inclusion criteria. Our report included a representative sample of the Mexican adolescent population, while the previous study limited their observations to adolescents attending junior high and high schools in Mexico City. Several reports have identified that schools could be stressful environments that contribute to the appearance of eating disorders.<sup>28</sup> In addition, adolescents in schools are more exposed to



media messages that influence their eating behaviors and beliefs. Our results also differ from previous reports in the proportion of affected males. We observed that the difference between genders is smaller (one male for every three females) than that presented in regional studies focused on students (one male for every nine females). Our findings are similar to those reported by Hudson, Hiripi, Pope and Kessler<sup>28</sup> in the first nationwide representative survey done in the United States related to eating disorders. These data support the need of population-based data instead of regional studies that have a limited ability to represent the overall population and the real magnitude of the problem.

One of the most frequent abnormal eating behaviors found in Mexican adolescents is an intense fear of gaining weight (6.9% among males and 14.8% in females). The prevalence of this characteristic increased as adolescents became older. Medical services and media messages may involuntarily contribute to the problem, particularly after the rapid increase in the obesity prevalence recently documented. Properly selected information provided by teachers and a healthy family environment are critical factors to counteract unfavorable messages that lead to the construction of an abnormal body image, and to improve healthy patterns to prevent obesity.

Bing eating was a common abnormality both in males (8.8%) and females (9.4%). The reported prevalence was higher than that reported in a similar study of the American population (2.0% in males and 3.5% in females).<sup>28</sup> This abnormal behavior is clinically relevant because it has been associated with several chronic disorders such as obesity and diabetes).<sup>21,29,30</sup> Its presence should be sought in all patients with metabolic syndrome. Failure to treat it results in lack of adherence to therapy. Other behaviors that were frequent in the analyzed population were loss of control while eating and excessive exercising and fasting, both important predisposing features for the development of eating disorders that must be taken into account while designing preventive strategies.

Finally, abnormal eating behaviors were more common in urban locations, however, the prevalence in rural areas, while lower, must be considered a serious problem.<sup>31</sup> Given the regional and location patterns, we think that eating disorders in Mexico are not necessarily a problem limited to a specific socio-demographic group.

In addition to the importance of preventing abnormal eating behaviors, better training and knowledge of these problems could improve our understanding of adherence in chronic diseases, which require significant lifestyle changes.<sup>32-34</sup> These results are important because eating disorders are pathologies associated with risk for

addictions<sup>22,23</sup> and obesity,<sup>21</sup> two main health problems in adolescents in Mexico.

Since these pathologies have a minor prevalence compared to the non-communicable chronic diseases studied in the ENSANUT, there was not enough power to stratify by state. These results were useful to understand the magnitude and characteristics of eating behavior risks in the Mexican adolescent population and the information could be useful to design targeted public health strategies to prevent eating disorders in populations at risk.

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